



Significant potential aerosol number and mass concentration in urban areas at elevated ozone and light conditions

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Aerosol number and mass concentration are key question marks to assess effects of urban environments for human health and for regional climate conditions. In order to quantify the potential of atmospheric gases in urban air the novel movable twin chamber COMPASS was constructed and applied in Frankfurt/Main. One chamber serves as a reference chamber to measure ambient conditions, while the second is used to study the effect of modified conditions. Here we present the first results from Frankfurt with elevated ozone and with light modification. Increasing ozone to several hundred ppb caused both, i.e. particle number concentration and mass to increase by about 30-80% depending on the time of the day and on NO_x -levels. The opposite was observed for darkening one of the chambers. In the darkened chamber particle number concentrations reduced by 40-60% during daytime with no effect apparent during the night. A similar but more intense behavior was found for the aerosol mass. Several organic masses have been figured out as relevant for explaining the observations made. From our first stage campaign it becomes obvious that the urban air contains notable resources for intensifying the pollution effects. This will have consequences for urban air quality control and local climate in a warming world.